Find the vertex and x-intercepts

① $\frac{2x^2}{2} + \frac{6x}{2} + \frac{1}{2} = \frac{0}{2}$

$x^2 + 3x + \frac{1}{2} = 0$

② $x^2 + 3x = -\frac{1}{2}$

$\frac{1}{2}(3) = \frac{3}{2}$, $\left(\frac{3}{2}\right)^2 = \frac{9}{4}$ add it

③ $x^2 + 3x + \frac{9}{4} = -\frac{1}{2} + \frac{9}{4}$

$-\frac{2}{4} + \frac{9}{4}$

④ $\left(x + \frac{3}{2}\right)^2 = \frac{7}{4}$

⑤ $\left(x + \frac{3}{2}\right)^2 - \frac{7}{4} = 0$

⑥ $2\left(x + \frac{3}{2}\right)^2 - \frac{7}{2} = 0$

$+\frac{7}{2}$ $+\frac{7}{2}$

$\frac{2\left(x + \frac{3}{2}\right)^2}{2} = \frac{\frac{7}{2}}{2}$

$\left(x + \frac{3}{2}\right)^2 = \frac{7}{4}$

$\sqrt{}$ $\sqrt{}$

$x + \frac{3}{2} = \pm\frac{\sqrt{7}}{2}$

$-\frac{3}{2}$ $-\frac{3}{2}$

$$\boxed{x = \frac{-3 \pm \sqrt{7}}{2}}$$

vertex $\left(\frac{3}{2}, -\frac{7}{2}\right)$

$\sqrt{1.75}$ -1.5

②

$x^2 - 4x + 4 = 100$

$-4 \quad -4$

$\frac{1}{2}(-4) = -2, (-2)^2 = 4$, add it

② $x^2 - 4x = 96$

③ $x^2 - 4x + 4 = 96 + 4$

④ $(x-2)^2 = 100$

$(x-2)^2 - 100 = 0$

$+100 \quad +100$

$(x-2)^2 = 100$

$\sqrt{\quad} \qquad \sqrt{\quad}$

$x - 2 = \pm 10$

$+2 \quad +2$

$x = 12, -8$

(17) $w^2 - 8w - 9 = 0$

② $w^2 - 8w = 9$

$\frac{1}{2}(-8) = -4$, $(-4)^2 = 16$, add it

③ $w^2 - 8w + 16 = 9 + 16$

④ $(w - 4)^2 = 25$

⑤ $(w-4)^2 - 25 = 0$

$+25 \quad +25$

$(w-4)^2 = 25$

$\sqrt{} \qquad \sqrt{}$

$w - 4 = \pm 5$

$+4 \quad +4$

$w = 9, -1$

$\frac{-x^2}{-1} + \frac{4x}{-1} - \frac{1}{-1} = \frac{0}{-1}$

$x^2 - 4x + 1 = 0$
$\quad\quad -1 \quad -1$

$x^2 - 4x = -1$

$\frac{1}{2}(-4) = -2, (-2)^2 = 4$, add it

$x^2 - 4x + 4 = -1 + 4$

$(x-2)^2 = 3$

$(x-2)^2 - 3 = 0$

$-(x-2)^2 + 3 = y$

(28)

$y = x^2 + 4x - 7$

$x^2 + 4x - 7 = 0$

$+7 \quad +7$

$x^2 + 4x = 7$

$\frac{1}{2}(4) = 2, \quad 2^2 = 4,$ add it

$x^2 + 4x + 4 = 7 + 4$

$(x + 2)^2 = 11$

$y = (x+2)^2 - 11$

(27)

$\frac{4x^2}{4} + \frac{4x}{4} = \frac{3}{4}$

$x^2 + x = 3/4$

$\frac{1}{2}(1) = \frac{1}{2}, \left(\frac{1}{2}\right)^2 = \frac{1}{4}$, add it

$x^2 + x + \frac{1}{4} = 3/4 + \frac{1}{4}$

$\left(x + \frac{1}{2}\right)^2 = 1$

$\left(x + \frac{1}{2}\right)^2 - 1 = 0$

$4\left(x+\frac{1}{2}\right)^2 - 4 = 0$

$+4 \quad +4$

$\frac{4\left(x+\frac{1}{2}\right)^2}{4} = \frac{4}{4}$

$\left(x+\frac{1}{2}\right)^2 = 1$

$\sqrt{} \qquad \sqrt{}$

$x + \frac{1}{2} = \pm 1$

$-\frac{1}{2} \quad -\frac{1}{2}$

$x = \frac{1}{2}, -3/2$

-1.5

$$\frac{a}{a}x^2+\frac{b}{a}x+\frac{c}{a}=\frac{0}{a}$$

① $x^2+\frac{b}{a}x+\frac{c}{a}=0$

② $x^2+\frac{b}{a}x=-\frac{c}{a}$

$\frac{1}{2}\left(\frac{b}{a}\right)=\frac{b}{2a}$, $\left(\frac{b}{2a}\right)^2=\frac{b^2}{4a^2}$ add it

$-\frac{c}{a}\cdot\frac{4a}{4a}=\frac{-4ac}{4a^2}+\frac{b^2}{4a^2}$

③ $x^2+\frac{b}{a}x+\frac{b^2}{4a^2}=-\frac{c}{a}+\frac{b^2}{4a^2}$

$\sqrt{\left(x+\frac{b}{2a}\right)^2}=\sqrt{\frac{b^2-4ac}{4a^2}}$

$x+\frac{b}{2a}=\frac{\pm\sqrt{b^2-4ac}}{2a}$

$-\frac{b}{2a}$ $-\frac{b}{2a}$

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

Quadratic Formula

$ax^2+bx+c=0$

$2x^2+6x+1=0$

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

$a=2$

$b=6$

$c=1$

$$x=\frac{-6\pm\sqrt{6^2-4(2)(1)}}{2(2)}$$

$$x=\frac{-6\pm\sqrt{36-8}}{4}$$

$$\boxed{x=\frac{-6\pm\sqrt{28}}{4}}$$

$$\frac{-3\pm\sqrt{7}}{2}$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Sect. 5.8

#1, 2, 5, 7-10, 20-23 (leave answers in Sq. roots unless they simplify nicely

Sing Song